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ORIGINAL ARTICLE

Microdebrider-assisted Adenoidectomy Versus Coblation-assisted Adenoidectomy for Management of Adenoid : A Comparative Study

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ABSTRACT

Background: Adenoidectomy procedures that involve coblation tend to be less painful than other surgical procedures. However, the superiority of coblation is still a debate. This study aimed to compare the results and the outcome of microdebrider versus coblation under endoscopic guidance for the management of adenoid and address the surgical difficulties.

Methods: We carried out this non-randomized controlled study on 40 patients complaining of nasal blockage, snoring, mouth breathing, and recurrent rhinitis due to adenoid. They were divided randomly and equally into two groups and underwent trans-oral 70˚ endoscopic-assisted adenoidectomy using either microdebrider modality (Group A) or the coblation (Group B). The two techniques were compared regarding the intraoperative time, bleeding, completeness of removal, and any damage to the adjacent structures. Postoperatively, the patients were assessed for complications.

Results: In group A, the median operative time was statistically significant shorter (*P*-value = 0.011) than group B (25 vs 30 minutes). The median blood loss in group A was 20 ml, while in group B the blood loss was less than 10 ml in all patients with a statistically significant difference ($P < 0.001$) between both groups. Ten patients (50%) in group A had mild to moderate postoperative neck pain, while two patients (10%) in group B had mild postoperative neck pain with a statistically significant difference between the both groups (*P*-value = 0.006).

Conclusions: Trans-oral endoscopic-assisted adenoidectomy either by coblation or microdebrider is highly efficacious in the complete removal of adenoid tissue under vision. Coblation-assisted adenoidectomy demonstrated less intraoperative blood loss, postoperative throat and neck pain, and halitosis. Whilst, microdebrider-assisted adenoidectomy has a shorter operative time.

Key Words: Microdebrider-assisted; Coblation-assisted,;Adenoidectomy

INTRODUCTION

Originally outlined by Mayer in 1868, the adenoid is a cluster of nasopharyngeal lymphoid tissues that make up the Waldeyer ring. Due to the hyperactivity of the immune system, an adenoid often increases steadily in size over the course of several years following birth, despite being very small at birth [1].

Among the most prevalent causes of nasal obstruction, mouth breathing, snoring, speech problems, and obstructive sleep disordered breathing in children is adenoid or chronic adenoiditis. It is also known to increase the likelihood of dentofacial deformities and otitis media [2].

Out of all the surgical operations done on children, adenoidectomy is among the most common. In the realm of outpatient procedures, it ranks just behind tonsillectomy and grommet tube insertion. It was in 1885 that Wilhelm

Meyer initially detailed conventional adenoidectomy [3]. Adenoidectomy is often performed using the adenotome, transoral cold curettage, packing, and, in rare occasions, electrocautery [4]. Alternative techniques have been developed because to dissatisfaction with the conventional technique's ability to remove the adenoid tissue safely and adequately. Subsequently, over the years, variant techniques for adenoidectomy have been developed e.g. suction monopolar electrocautery, microdebrider, coblation, and laser [5].

The optimal approach for adenoidectomy would make it easier for the surgeon to see the adenoid pad, which would lead to its full removal with little blood loss and pain after the procedure. The recent adenoidectomy methods should add precision during resection with less blood loss and a lower complication rate. Despite the high frequency with which adenoidectomy is performed, there is a lack of data for comparing its recent techniques [6]. Microdebriders are instruments that shave soft tissue by rotating a shaving mechanism and continuously sucking it out through a blunt cannula on the side of the device. Its usage in endoscopic sinus surgery for tissue debridement has been extensive. A newly documented approach is power-assisted adenoidectomy utilizing a microdebrider. The oscillating cutting action of the shaver blade decreases bleeding and the continuous suction maintains a clear vision, thus enhancing safety. The microdebrider's shaving action and suction allow it to remove tissue down to the less vascular fascial plane. Additionally, the use of irrigation in conjunction with the microdebrider facilitates faster hemostasis [7,8].

Coblation is a new method introduced to the otorhinolaryngology field. By using relatively lower heat (60-70°C) than other methods as bipolar diathermy or suction monobolar, and concurrent saline irrigation, it is able to ablate tissue through the coblator wand, which may have minimal thermal impacts on the surrounding tissue [9,10].In addition to reducing tissue damage and fibrosis to nearby structures like the Eustachian tube, coblation also makes the operative field bloodless. Nevertheless, its pricier price tag can discourage some from using it frequently [11,12].

We hypothesized that using endoscopic-assisted microdebrider and coblation for surgical management of adenoid has the value of achieving good visualization of the surgical field, assuring complete tissue removal, decreasing recurrence incidence, and minimizing complications such as postoperative pain and intraoperative and postoperative bleeding with distinctive values for each in term of pain control, blood loss, and intraoperative time regarding the comparison between the new two methods

The present study aimed to compare the results and the outcome of microdebrider versus coblation under endoscopic guidance for the management of adenoid and address the surgical difficulties.

METHODS

We performed this non-randomized controlled study on 40 patients complaining of nasal blockage, mouth breathing, snoring, as well as recurrent rhinitis due to adenoid who were managed by trans-oral 70◦ endoscopic-assisted adenoidectomy using either microdebrider modality or the coblation in the period from March 2023 to March 2024 in the Otorhinolaryngology Department, Zagazig University Hospitals.

Written informed consent was collected from all parents of the participants. The approval for the study was obtained from the Institutional Review Board (#.....) and the research was conducted in accordance with the Helsinki Declaration.

Inclusion criteria: We included patients from both sexes aged > ٢ years, having nasal blockage, mouth breathing, snoring, as well as recurrent rhinitis due to adenoid either alone or with otitis media with effusion (diagnosed by clinical evaluation in addition to Plain x-ray neck (soft tissue, lateral view) or computed tomography (CT) scanning of the nose and paranasal sinuses without contrast)

***Exclusion criteria*:** We excluded all cases who were younger than 2 years old, unfit for surgery and were undergoing an additional procedure with adenoidectomy e.g. tonsillectomy, septoplasty, functional endoscopic sinus surgery (FESS), or inferior turbinate reduction, or having neuromuscular disorders or craniofacial anomalies.

Complete history taking including: A detailed history including nasal blockage, snoring, mouth breathing, and recurrent rhinitis. Complete ENT Clinical evaluation: Adenoid hypertrophy was characterized by a hyponasal quality to the voice, mouth breathing, and, on physical examination, a high arched hard palate, midface protrusion, elevated cheekbones, all of which are known as adenoid facies. Radiodiagnosis: Computerized tomography (CT) scans of the nasal passages and paranasal sinuses without contrast, or plain x-rays of the neck (soft tissues, side views were done).

Laboratory investigations involved: (complete blood count, prothrombin time, and bleeding and coagulation time; biochemical tests for fasting and postprandial blood glucose, liver function tests, and renal function tests.

Twenty patients in each group were randomly assigned to the following:

Group A: Patients undergoing adenoidectomy using microdebrider under endoscopic guidance.

Group B: Patients undergoing adenoidectomy using coblation under endoscopic guidance.

The Operative Technique

The patient was positioned supine with their head slightly rotated toward the surgeon and flexed to 15º while under controlled hypotensive general anesthesia with cuffed oral endotracheal intubation. After nasal decongestion, nasal endoscopy was performed using a 4-mm nasal endoscope 0˚ to grade the adenoid size using the Clemens grading system [13]: **Grade I:** The adenoid tissue occupies a third of the choana's vertical height. **Grade II:** The choana was composed of adenoid tissue, which occupies around two-thirds of its vertical height. **Grade III:** Expanding adenoid tissue to fill around two-thirds of the choana vertical height or reaching to nearly fill the entire choana. **Grade IV:** Complete block of the choana by adenoid tissue. Then, a shoulder roll was applied, Boyle–Davis mouth-gag was placed, after retraction of the soft palate, a narrow catheter coated with ointment was inserted into the nasal cavity, and 70˚ rigid nasal endoscope was applied transorally and used to visualize the nasopharynx and assess the choanae.

Group A: The microdebrider (Stryker Core Powered Instrument Driver) with an irrigating blade of angle 45˚ was applied transorally under the guidance of a 70˚ rigid nasal endoscope. Shaving the adenoid tissue under constant endoscopic vision was accomplished by means of a rotating blade.

To prevent damaging the underlying structures, the resection was carried out side-to-side on a flat surface until it reaches the inferior edge of the adenoid pad. A full resection of the adenoid tissue was performed, reaching the nasopharyngeal roof, continuing laterally to the orifices of the Eustachian tube, and anteriorly to the choanae.

By removing adenoid tissue and blood at the same time, the microdebrider's cutting and suction action allows for a clear view. The uvula, soft palate, and adjacent structures are handled with utmost care to avoid injury.

A nasopharyngeal pack was applied to the adenoid bed for 5-10 minutes. Following the removal of the pack, suction mono-polar electro-cautery was used to complete hemostasis (Figure 1).

Group B: Coblator II (ArthroCare ENT, RF8000E, Arthrocare Corporation, USA) was used. The power level was set to 9 W in the ablation mode and 5 W in the coagulation mode. Coblator wand Evac 70 Wand (Smith and Nephew) was applied transorally By the use of a 70◦ rigid endoscope for the nose, to ablate the adenoid tissue and then remove it entirely. Care was taken not to injure the uvula, soft palate, or surrounding structures. During adenoidectomy either by microdebrider or coblation, we assure complete removal of just the adenoid tissue down to its bed with no harm to the adjacent structures either during removal or hemostasis. In both groups, we documented every patient's adenoid size, surgical time, blood loss, removal extent, and any harm to adjacent structures (Figure 2).

Postoperatively:

All patients were given oral amoxicillin clavulanic acid, oral analgesic, and nasal decongestant drops for one week and saline nasal spray for two weeks. One week postoperatively, the patients were assessed for fever, throat pain, bleeding, neck pains, and halitosis.

A standard visual analogue scale (VAS) system was used to assess subjectively the severity of throat pain and neck pain. The visual analog scale (VAS) was a 10-centimeter line with the numbers 0 (no pain) and 10 (pain as severe as it may be) at either end [14].

Every patient was given a pain scale and asked to mark the line according to their present level of discomfort. The patient's mark and the 0 "no pain" anchor are located on a 10-centimeter line; the distance between the two was used to calculate the score. No pain (0), mild pain(1-3), moderate pain(4-6), and severe pain (7-9) are the cutoffs on the pain VAS. The more severe the pain, the higher the score.

Regarding the neck pain, the cases were asked for tilting their heads and observed for pain, limited head movement, or stiffness. For halitosis, the patients or patients' parents were asked if there was
any mal odor of breath.

STATISTICAL ANALYSIS

The latest version of SPSS (Statistical Package for the Social Sciences) was used to conduct the data analysis. When applicable, we used the chi-square test and the Fisher exact test to compare categorical variables, and we reported them using their absolute frequencies. Using chi-square for trend testing, we compared ordinal data from two sets. Assumptions utilized in parametric testing were checked using the Shapiro-Wilk test. The median and interquartile range were used to characterize the quantitative variables. The quantitative data was compared between the two groups using the Mann Whitney test, which is applicable to data that is not regularly distributed. To determine the degree and direction of the correlation between two variables, the Spearman rank correlation coefficient was utilized. P < 0.05 was established as the criterion of statistical significance.

RESULTS

This study comprised 40 patients complaining of mouth breathing, nasal obstruction, snoring, and recurrent rhinitis due to adenoid hypertrophy with decreased hearing in 7 patients due to bilateral otitis media with effusion. Seventeen patients were female (42.5%) and 23 patients (57.5%) were male with a mean age of 10.73±5.74 years, there was no statistically significant difference between groups A and B(P-value = 0.086), the median age of patients in group A was 10.79 years and 7.71 years, respectively (Table 1). With respect to the adenoid grade, there was no statistically significant difference between the two groups (P-value = 0.829); 7 patients (17.5%) had grade 2, 17 patients (42.5%) had grade 3, and 16 patients (40%) had grade 4 (Table 2).

Thirty-three patients (82.5%) underwent adenoidectomy alone, while seven patients (17.5%) underwent adenoidectomy and bilateral myringotomy with grommet tube insertion with a statistically non-significant difference between both groups (*P* > 0.999). Intra-operatively, in both groups, because of the 70° endoscopic guidance, the adenoid was completely removed in all the patients without any injury to the adjacent structures e.g. torus tubaris, soft palate, uvula, and posterior part of the septum. Postoperatively, in both groups, all the patients reported improved nasal blockage, snoring, and mouth breathing (Table 3).

In group A, the median operative time was statistically significant shorter (*P*-value = 0.011) than group B (25 vs 30 minutes). The median blood loss in group A was 20 ml, while in group B the blood loss was less than 10 ml in all patients with a statistically significant difference (*P* < 0.001) between both groups (Table 3).

None of the patients in both groups had bleeding postoperatively. There was no statistically significant difference between the two groups concerning the 4 patients (20%) in group A who experienced a low-grade fever for 1-2 days and were treated with oral paracetamol (p-value was 0. 106). Nine patients in group A (45%) had mild throat pain and were treated by oral hydration and oral paracetamol with a statistically

significant difference between the two groups (*P* < 0.001) (Table 4).
Ten patients (50%) in group A had mild to moderate postoperative neck pain, while two patients (10%) in group B had mild postoperative neck pain with a statistically significant difference between the two groups (*P*-value = 0.006), Eight patients in group A (40%) had halitosis, whereas only 3 patients (15%) in group B had halitosis, but with a statistically no significant difference between the two groups (*P*-value = 0.155). Halitosis resolved spontaneously in all patients within 14 days (Table 4).

Table 1: The demographic data between the studied groups

	Group A	**Group B**		
	N = 20 (%)	**N = 20 (%)**	χ^2	***p***
Gender Female Male	 8 (40%) 12 (60%)	 9 (45%) 11 (55%	**0.102**	**0.749**
	Median (IQR)	**Median (IQR)**	**Z**	***p***
Age (year)	10.79 (7.0 – 15.31)	7.71 (4.5 – 13.83)	**-1.718**	**0.086**

Z: Mann Whitney test, χ^2: Chi-square test, **IQR**: Interquartile range
***P* < 0.05** = statistically significant

Table 2: Grade of adenoid

	Group A	**Group B**	χ^2	***p***
Grade	**N =20 (%)**	**N =20 (%)**		
2 **3** **4**	4 (20%) 8 (40%) 8 (40%)	3 (15%) 9 (45%) 8 (40%)	**0.046**	**0.829**

χ^2: Chi-square for trend test.
***P* < 0.05** = statistically significant

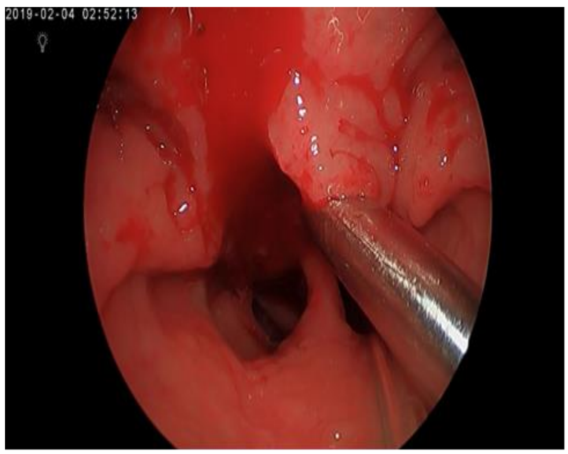
Table 3: The operative data among the studied groups

	Group A	**Group B**	χ^2	***p***
	N =20 (%)	**N =20 (%)**		
Type of surgery Adenoidectomy Adenoidectomy + Grommet tube insertion	 16 (80%) 4 (20%)	 17 (85%) 3 (15%)	**Fisher**	**> 0.999**
	Median (IQR)	**Median (IQR)**	**Z**	***p***
Operative time (min)	25 (20 – 30)	30 (25 – 33.75)	**- 2.545**	**0.011**
Blood loss (ml) **< 10 ml** **> 10 ml**	 0 (0%) 20 (100%)	 20 (100%) 0 (0%)	**40.0**	**< 0.001**
Blood loss (ml)	20 (15 – 25)			

Table 4: The postoperative symptoms among the studied groups

	Group A	Group B	χ^2	*p*
	N =20 (%)	N =20 (%)		
Fever				
Absent	16 (80%)	20 (100%)	**Fisher**	**0.106**
Present	4 (20%)	0 (0%)		
Throat pain				
Absent	11 (55%)	20 (100%)	**11.613**	**< 0.001**
Mild	9 (45%)	0 (0%)		
Neck pain				
Absent	10 (50%)	18 (90%)	**7.673§**	**0.006**
Mild	7 (35%)	2 (10%)		
Moderate	3 (15%)	0 (0%)		
Halitosis				
Absent	12 (60%)	17 (85%)	**Fisher**	**0.155**
Present	8 (40%)	3 (15%)		

χ^2: Chi-square test, **§**: Chi-square for trend test, ***P*** **< 0.05** = statistically significant



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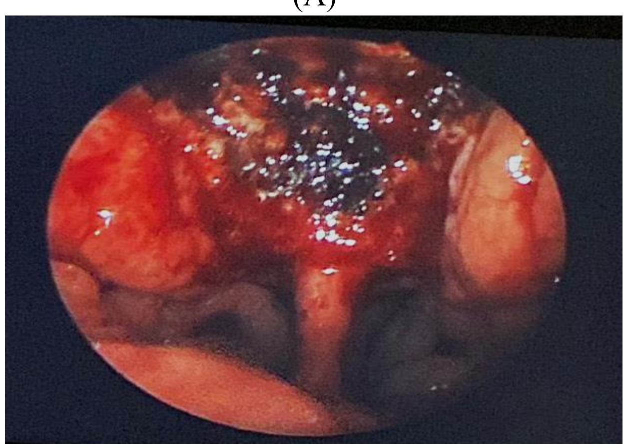
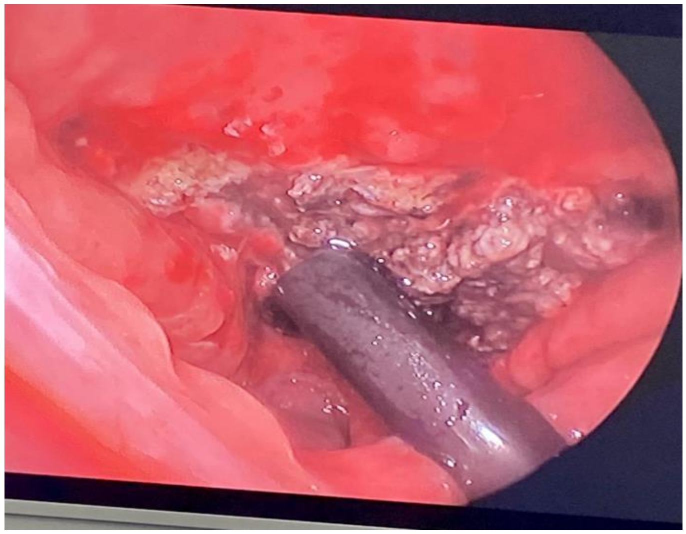


(B)

Figure 1: (**A**): The microdebrider blade is applied to the adenoid tissue, (**B**): Trans-oral 70◦ rigid nasal endoscopy: Suction mono-polar electro-cautery post microdebrider assisted adenoidectomy.



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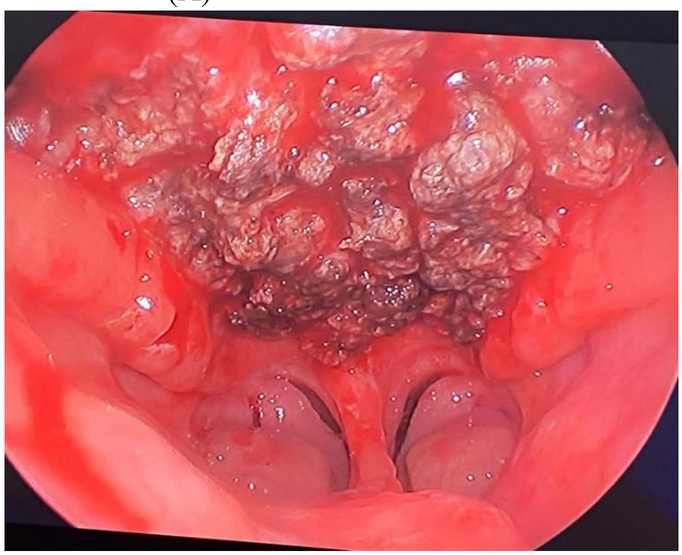

(B)

Figure 2: (A): The coblator wand is applied to the adenoid tissue, (B): Trans-oral 70◦ rigid nasal endoscopy, post coblation assisted adenoidectomy

DISCUSSION

The optimum adenoidectomy method would completely remove the adenoid, provide better symptom relief, and cause the fewest postoperative complications. Innovative methods for adenoidectomy should reduce blood loss and improve resection precision [13,15].

In the present study, the patients underwent trans-oral endoscopic-assisted adenoidectomy using either the coblation or microdebrider modality. It aimed to compare the results and the outcome of both modalities and address the surgical difficulties.

In the current work, intra-operatively, the median operative time in the microdebrider group was shorter than in the coblation group with a statistically significant difference. Whereas, the median blood loss in the microdebrider group was 20 ml, while in the coblation group, the blood loss was less than 10 ml in all patients with a statistically significant difference. However, there is no statistically significant correlation between the adenoid grade and either the operative time or blood loss.

The present study results agreed with that of Singh et al. [6] who stated that the average intraoperative time taken in the microdebrider group was shorter than in the coblation group. Whereas, the mean grade of intraoperative bleeding in the coblator group was less than in the microdebrider group. Also, Mularczyk et al. [12] and Liu et al. [16] reported that There was a substantial reduction in intraoperative blood loss while using the coblator modality compared to the microdebrider. In contrast to the microdebrider group, the coblation group needed significantly less time for surgery.

The current study's operative time result does not coincide with that of Sjogren et al. [17] who mentioned that the average surgical time was shorter in the coblation group compared to the microdebrider group with non statistically significant difference. Also, Kim et al. [18] revealed that the mean operative time of coblation-assisted adenoidectomy was shorter than that of microdebrider-assisted adenoidectomy with cauterization with a statistically significant difference.

Nasal endoscopy has replaced the traditional visualization. The use of a rigid nasal endoscope provides excellent visibility, allowing for the entire removal of adenoid tissue located anywhere in the nasopharynx, including intranasally and up to the opening of the Eustachian tube. In addition, the surgeon can precisely pinpoint the precise extent of the operation without harming adjacent structures, such as the tubal torus, by accurately identifying the relationship between the adenoid tissue and these structures. This reduces the risk of residual adenoid tissue. Additionally, the monitor can be magnified even further with the help of the camera attachment [8,19]. However, A full endoscopy setup in the operating room and the necessary preparatory time are two drawbacks of the endoscopic technique [20].

In the present work, the trans-oral endoscopic approach using a 70° rigid nasal endoscope allows direct access to the adenoid pad and eliminates the need for nasal decongestion. Consequently, in both groups, the adenoid was completely removed in all the patients with no injury to the adjacent structures to the adenoid e.g. torus tubaris, soft palate, uvula, and posterior part of the septum. Postoperatively, No one experienced bleeding, and everyone who took the medication noticed a marked improvement in their symptoms of nasal congestion, snoring, and mouth breathing.

Only in the microdebrider group, four patients had a low-grade fever and nine patients had mild throat pain. Whereas, ten patients in the microdebrider group and two patients in the coblator group had postoperative neck pain. Additionally, eight patients in the microdebrider group and three patients in the coblator group had halitosis.

The present study results are consistent with that of Singh et al. [6] who stated that the Compared to the microdebrider group, the coblation group experienced much less pain overall after surgery. Also, Mularczyk et al. [12] discovered that compared to the microdebrider group, the coblation group experienced shorter mean pain durations. However, Our findings contradict those of Liu et al. [16], who found that microdebrider procedures were associated with a lower frequency of postoperative fever, neck pain, and halitosis than coblation procedures.

Causes of neck pain following electro-cautery or coblation include inflammation and thermal radiation harm, which can travel through the prevertebral fascia and trigger spasms in the muscles. Coblation is a technique that uses low-frequency electric currents through a salt solution to vaporize tissue at temperatures between 60 and 70◦C, whereas conventional cautery uses temperatures between 400 and 600◦C to break down tissues [9,21]. With coblation and simultaneous saline irrigation, the surrounding tissue may be subjected to reduced thermal impacts due to the lower temperature. Consequently, this explains the higher incidence of postoperative neck pain in the microderider group as the microdebrider shaves off tissue, and subsequently suction mono-polar electro-cautery is used to control bleeding. Also, The use of electro-cautery, rather than the microdebrider shaver, may explain why the microdebrider group experienced a higher incidence of postoperative pain. Halitosis might be related to the decomposition of necrotic tissues and proteins at the site of adenoidectomy post electro-cautery or coblation due to bacterial growth.

There are clear benefits to using either microdebrider-assisted or coblation-assisted adenoidectomy instead of the more conventional procedures. Thanks to its oscillating shaver blade that reduces bleeding and constant suction that keeps a clear vision, the microdebrider offers safer, more accurate resection than traditional curettage. Unlike the curette, which can leave behind bleeding tissue due to its pushing and cutting action, the microdebrider can remove tissue down to a less vascular fascial plane by means of its suction and shaving action. A faster hemostasis can be achieved by irrigation in conjunction with the microdebrider. It permits a less invasive excision around the choana and torus tubaris, a more precise control over the resection depth, and less blood loss overall [8,22].

The coblation device has multiple functions including ablation, coagulation, suction, and irrigation [23]. With a bloodless surgical field created by coblation, the surgical site can be seen clearly. In addition to improving accuracy, these variables may reduce the likelihood of collateral tissue injury and fibrosis in the surrounding tissues, most notably the Eustachian tube [11]. It also employs a bipolar current via salt, which, when applied to an oxygen-rich atmosphere, does not generate a spark. The risk of airway fire is much reduced compared to the routinely used mono-polar electro-cautery treatments following the microdebrider [24].

The ability to ablate and cauterize tissue with a single device is the primary benefit of coblation over microdebrider. To stop the bleeding that occurs after using the microdebrider, suction electro-cautery is necessary. A potential drawback of using the coblator wand and microdebrider is their greater price [24].

In the present study, the coblation-assisted adenoidectomy was superior to the microdebrider-assisted (power-assisted) adenoidectomy as regards intraoperative blood loss, postoperative throat and neck pain, and halitosis. Whereas, the microdebrider modality was superior to the coblation modality for the operative time. Subsequently, the reduced surgical time helps to decrease exposure to anesthetics and the associated risks and save costs.

However , regarding regrowth after adenoidectomy , kim et al [25] Found out that The adenoid regrowth at 1 year after adenoidectomy was observed in 25 patients out of 188 who underwent adenoidectomy by coblation (13.3%) . The regrowth group was significantly younger than no regrowth group, and the preoperative adenoids were larger in regrowth group than in no regrowth group. The symptoms of sleep disordered breathing recurred in two patients and they had revision adenoidectomy.

On the same contest , Jaber [26] found out that only 2 patients out of 100 patients who underwent adenoidectomy by microdebrider (0.02%) developed adenoid recurrence in form of Clemens grade 2 and 3 respectively 1 year post operative.

In the contrast , In our study , assessment of recurrence or regrowth of adenoid is limited due to short period of post operative follow up (1 week) and the need for longer post operative follow up period , and the need for endoscopic assessment to evaluate regrowth of adenoid tissue , which may be difficult or unpleasant specially in pediatric age groups . also , many cases may lost during follow up.

RECOMMENDATIONS

As the current work has limitations regarding the sample size of the study which was small and the follow-up period was short , so Endoscopic assessment is suggested to assess the completeness of resection postoperatively. Moreover, retrospective studies over longer periods of follow up are proposed to assess the efficacy of each modality and define the rate of possible recurrence.

Also, Trans-oral endoscopic-assisted adenoidectomy either by coblation or microdebrider is highly efficacious in the complete removal of adenoid tissue under vision. Coblation – assisted adenoidectomy offers less intraoperative blood loss , post operative throat and neck pain , and halitosis and potentially faster recovery . whilst , microdebrider – assisted adenoidectomy has a shorter operative time with subsequent lower costs. So we shall recommend increasing the usage of the new endoscopic assisted powered instruments as microdebrider and coblation over the old conventional methods for adenoidectomy whenever possible to assure less complications and better results .

CONCLUSIONS

Endoscopic-assisted adenoidectomy either by coblation or microdebrider is a safe and effective method for achieving a complete adenoidectomy with a low incidence of complications. Both methods have shown effectiveness in alleviating symptoms associated with adenoid hypertrophy. The main advantage of coblation in adenoidectomy is the ability to use a single instrument to ablate and coagulate tissue. Coblation-assisted adenoidectomy offers less intraoperative blood loss, postoperative throat and neck pain, and halitosis, and potentially faster recovery. Whilst microdebrider-assisted adenoidectomy has a shorter operative time with subsequent lower costs.

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